



Supplementary Information on KODAK EKTAMAX RA Professional Paper

KODAK EKTAMAX RA Professional Paper uses colored dyes to form black-and-white images in prints made from color and black-and-white negatives. It is designed for processing in KODAK EKTACOLOR RA Chemicals for Process RA-4 along with color negative papers.

The information in this publication supplements the information provided in the instruction sheet and in KODAK Publication No. G-22, *KODAK EKTAMAX RA Professional Paper*.

CHARACTERISTICS AND APPLICATIONS

Suggested uses for EKTAMAX RA Professional Paper include intermediate applications for graphics reproduction, displays, real-estate brochures, publications, press releases, and portrait proofs. The paper may also be acceptable for other applications in which long-term display and keeping are **not** required. In applications that require archival or long-term keeping or complete image neutrality, a traditional black-and-white paper is a better choice.

STORAGE AND HANDLING

Store unexposed paper at 13°C (55°F) or lower in the original sealed package. High temperatures or high humidity may produce undesirable photographic changes. *Storage of unexposed paper at room temperature will produce a hue shift over time* (see "Effects of Storage Conditions").

Avoid moisture condensation by removing the package from cold storage the day before printing.

Handle paper carefully by the edges. The paper is packaged with the emulsion side of all sheets facing in the same direction. For complete light and moisture protection, use the inner bag and the two-part cardboard box to store the paper.

EXPOSURE RECOMMENDATIONS

The spectral sensitivity and printing speed of KODAK EKTAMAX RA Professional Paper are designed to be the same as those of KODAK PROFESSIONAL PORTRA, SUPRA, and ULTRA Papers. Therefore, printing EKTAMAX RA Paper should be very similar to printing KODAK PROFESSIONAL Papers. If you are printing color negatives and have a balance setup for those color papers, you can use that setup for EKTAMAX RA Paper. An adjustment of filtration from that balance will not change the

hue of EKTAMAX RA Paper, but it will cause a change in contrast.

If you are printing black-and-white negatives onto EKTAMAX RA Paper, two methods can provide suitable results:

- Put a piece of processed D-min from KODAK PROFESSIONAL PORTRA Film in the exposing beam along with the filters you normally use to print color negatives.
- To the filtration that you use to print color negatives, add 35 units of magenta and 65 units of yellow filtration to simulate a piece of film D-min.

If you do not have any processed D-min from PROFESSIONAL PORTRA Film or a starting filter pack, a filter pack of 80M + 110Y is a reasonable starting point.

LATENT-IMAGE KEEPING

You should not notice shifts in the latent image with keeping times from 1 minute to 24 hours. Therefore, you do not need to change your printing procedures to compensate for latent-image shifts under normal temperature and handling conditions. (If shifts do occur, you can minimize their effect by keeping the time between exposure and processing the same for all paper.)

IMAGE HUE

The term "hue" usually doesn't apply to untuned black-and-white papers. However, this paper can exhibit slight variations in hue because it uses colored dyes to form images. When we use the term "hue" in this publication, we are referring to the image tone (or image-tone neutrality) of prints. We will use hue interchangeably with image tone to describe images that vary slightly from neutral.

Those who view prints on this paper expect them to appear neutral. Therefore, viewers are more sensitive to hue variations in prints on EKTAMAX RA Paper than they are to hue variations in color prints.

The most likely contributor to hue variations is the color quality of the viewing light. However, improper storage conditions and some processing problems can also cause variations in hue. (The references to hue in the following sections are based on tests made in the school-finishing and commercial markets.)

Effects of Viewing Conditions

Under certain types of illumination, the hue of prints on EKTAMAX RA Paper can appear warm. A silver-based black-and-white image reflects all frequencies of light equally, so a slight deficiency in one color of the viewing light will not have an adverse effect. A chromogenic image—e.g., an image on EKTAMAX RA Paper—is formed by dyes that have specific color absorption and reflection characteristics. Dyes do not reflect all frequencies of light equally. Instead, they reflect only specific wavelengths of red, green, and blue light. If a light source is slightly deficient in green light, a chromogenic print may look very pink (magenta) depending on the dye and the green-region deficiency of the light source.

To evaluate and display prints, use light sources such as tungsten and tungsten halogen/quartz halogen. These light sources provide a continuous frequency distribution of energy in the visible spectrum, and the image will appear neutral. Non-continuous light sources, such as mercury vapor and some fluorescent tubes, can give the image a slightly pink appearance.

A good average viewing condition is a light source with a color temperature of 5000 ± 1000 K, a Color Rendering Index (CRI) of 85 to 100, and an illuminance of at least 50 footcandles (538 lux). Fluorescent lamps such as the cool white deluxe lamp (made by several manufacturers) meet these conditions. You can also use warmer lamps, such as the Phillips 5000 K Ultralume, or a mixture of incandescent and fluorescent lamps. For each pair of 40-watt cool white deluxe fluorescent lamps, use a 75-watt frosted tungsten bulb. Your light source should meet the standards specified in ANSI PH2.30-1989, *Viewing Conditions—Color Prints, Transparencies, and Photomechanical Reproductions*.

For consistency, labs should always evaluate print quality under the same type of lighting conditions that will be used for print viewing and display.

Effects of Storage Conditions

When kept under refrigerated conditions (13°C [55°F] or lower), this paper can age for 18 months and still be within limits for hue. As unexposed, unprocessed paper ages, its hue moves in a green direction.

Room-temperature storage will accelerate the aging effect, and will cause a change in hue. After three months at room temperature, the hue will be about halfway to the limit, but prints made on the paper will still be acceptable. After six months at room temperature, the hue will be close to the limit, and you will notice a hue in prints.

Effects of Processing Problems

Severe developer oxidation or low processor utilization will produce a slightly pink (magenta) hue in images on EKTAMAX RA Paper. Extreme contamination of the developer with bleach-fix will produce a green hue shift and a green D-min. In most cases, a process condition that causes a noticeable hue shift will also yield unacceptable results with KODAK PROFESSIONAL PORTRA, SUPRA, and ULTRA Papers, and will be evident in control-strip plots.

The one condition that process controls strips do not show very well is the formation of leuco cyan dye. With color papers, a slight level of leuco cyan dye can be tolerated in prints, and will show up in the control plots to a very limited degree. However, even low levels of leuco cyan dye can cause a red hue in images on EKTAMAX RA Paper.

The following section, “Process Troubleshooting,” describes ways to avoid and correct process problems that cause a hue shift in EKTAMAX RA Paper.

PROCESS TROUBLESHOOTING

Images on EKTAMAX RA Professional Paper that have a noticeable hue may indicate that your process has a developer or a bleach-fix problem.



Important

Before making any changes to your process, be sure that you are using the appropriate light source to view the prints. An apparent hue shift may be related to viewing conditions.

Identifying the Problem

Follow the steps below to identify the cause of a hue shift:

If the image tone is <i>cold</i>	<ol style="list-style-type: none">1. Check for high developer activity (e.g., high replenishment rate, high temperature, contamination of the developer by bleach-fix, etc.)2. Check control plots.
If the image tone is <i>warm</i>	<ol style="list-style-type: none">1. Check for leuco cyan dye (follow procedure outlined below); if none is present, proceed to Step 2. If leuco cyan dye is present, see “Leuco cyan dye/low bleach-fix pH.”2. Identify the image tone as pink or red.
If the image tone is <i>pink</i> (magenta)*	<ol style="list-style-type: none">a. Check for low developer activity (e.g., low utilization, low replenishment, high oxidation, etc.); if none is present, proceed to Step b.b. Check for excess developer in the bleach-fix (excessive carryover or low bleach-fix replenishment).
If the image tone is <i>red</i> *	<ol style="list-style-type: none">a. Recheck for leuco cyan dye.

* You can use the KODAK Color Print Viewing Filter Kit to differentiate between pink and red. If prints look better through the cyan filter than through the green filter, the hue is red. You can suspect that leuco cyan dye is present.

Procedure to Confirm Leuco Cyan Dye. If you suspect that leuco cyan dye is the cause of a red image tone, you can bleach a processed print in FLEXICOLOR Bleach III Replenisher to confirm a leuco cyan dye condition. Follow this procedure:

1. Choose a print with a neutral density between 1.20 and 2.00 (1.60 to 1.80 is best). Take density readings of specific areas on the print and mark the spots so that you can take comparison readings after bleaching the print.
2. Immerse the print in FLEXICOLOR Bleach III Replenisher solution at 21°C (70°F) for 2 minutes.
3. Rinse the print for 1 minute in running water at 21 to 43.3°C (70 to 110°F).
4. After rinsing the print, run it through the last wash and the dryer of the same processor used to process the print the first time. It is important to achieve the same surface gloss, because the gloss will affect the density reading.

After bleaching, washing, and drying, read the red and green densities in the areas you marked. Subtract the original red and green densities of the print from the red and green density readings of the print after bleaching. Then subtract the green density difference from the red density difference. If the answer is greater than 0.10, leuco cyan dye is confirmed.

Example:

	Red	Green
Density after bleaching	1.90	1.84
Original density	<u>1.75</u>	<u>1.80</u>
Difference	0.15	0.04

Because the red density difference minus the green density difference is greater than 0.10 ($0.15 - 0.04 = 0.11$), the test confirms that leuco cyan dye is the problem.

Correcting Process Problems

Follow the appropriate procedure below to correct the process problem identified in the preceding section.

High developer activity

High activity may be due to a high replenishment rate, a high temperature, or bleach-fix contamination of the developer. When you have identified the cause of the condition, make adjustments to correct it.

Low developer activity

Low activity may be due to low processor utilization, a low replenishment rate, or high oxidation. You can notice this condition in your control plots. In addition to having a slightly pink hue, prints on EKTAMAX RA Paper will have a “muddy” upper scale. When you have identified the cause of the condition, make adjustments to correct it.

**Excess developer in the bleach-fix/
high bleach-fix pH**

Excessive amounts of developer in the bleach-fix may be due to inefficient squeegees in the developer or low bleach-fix replenishment. Any condition that allows the pH of the bleach-fix to increase can produce a slightly pink image tone.

These conditions are not generally reflected in the control plots, but you can correct them by reducing the pH of the bleach-fix. Add KODAK EKTACOLOR RA Bleach-Fix and Replenisher NR, Part C, or glacial acetic acid (see the following table).



Caution

Before making changes to the bleach-fix, verify that the pink hue is not caused by a developer activity problem. Check your developer replenishment rate, processor utilization, and control plots. Overuse of the following prescription will cause leuco cyan dye problems. Be sure to verify that the pink hue is not developer-related before applying this prescription.

Addition of KODAK EKTACOLOR RA Bleach-Fix and Replenisher NR, Part C, or Glacial Acetic Acid	
If your processor uses	Add this amount of EKTACOLOR RA Bleach-Fix and Replenisher NR, Part C, or glacial acetic acid
EKTACOLOR RA Bleach-Fix and Replenisher	2.0 mL/L of tank volume
EKTACOLOR RA Bleach-Fix and Replenisher NR	2.2 mL/L of tank volume

Add the appropriate amount of EKTACOLOR RA Bleach-Fix and Replenisher NR, Part C, or glacial acetic acid to the bleach-fix tank. Allow the solution to mix thoroughly, and then process some test prints. If the pink cast is reduced but not eliminated, repeat the prescription once. If the pink cast does not change, *do not repeat the prescription*. If a pink hue remains after you apply the prescription a second time, it is likely that your process has a developer problem or that your viewing conditions are inadequate (recheck that you are using the appropriate light source).

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Leuco cyan dye/low bleach-fix pH

Leuco cyan dye is due to a low pH in the bleach-fix caused by a high replenishment rate or incorrect start-up (fresh tank) mixing procedure. It results in a warm reddish image tone due to some of the cyan dye being converted into an invisible state. Leuco cyan dye conditions that cause problems with color paper are also reflected in control plots (the black patch tends to have a lower red density than green and blue). EKTAMAX RA Paper will generally alert you to this condition before you see it on color paper production or in your control plots.

You can correct this problem by increasing the pH of the bleach-fix. Add KODAK EKTACOLOR RA Developer Starter, CAT 102 6681, or KODAK EKTACOLOR RA Bleach-Fix Desilvering Concentrate, CAT 844 4572, according to the following table.



Caution

Before making changes to the bleach-fix, verify that the hue is red (indicating low cyan dye) and not pink (indicating high magenta dye). Overuse of this prescription will cause other bleach-fix problems.

Addition of KODAK EKTACOLOR RA Developer Starter or KODAK EKTACOLOR RA Bleach-Fix Desilvering Concentrate	
If your processor uses	Add this amount of EKTACOLOR RA Developer Starter or EKTACOLOR RA Bleach-Fix Desilvering Concentrate
EKTACOLOR RA Bleach-Fix and Replenisher	12.0 mL/L of tank volume
EKTACOLOR RA Bleach-Fix and Replenisher NR	22.0 mL/L of tank volume

Note: When you add developer starter to the bleach-fix, foaming will occur. Turn off the bleach-fix recirculation system and add the starter very slowly. Wait several minutes for any foaming to dissipate before turning the recirculation pumps on. You may want to consider removing some bleach-fix from your working tank and adding the starter to that solution to avoid any chance of the bleach-fix foaming over and contaminating your developer tank. Slowly stir the starter into the bleach-fix solution, wait for any foaming to dissipate, then slowly return the solution to your bleach-fix tank.

After you apply this prescription, allow the solution to circulate for 15 to 20 minutes, and then process some test prints. If the red hue is reduced but not eliminated, repeat the prescription once. If the red hue does not change, *do not repeat the prescription*. If the red hue remains after you apply the prescription a second time, your process probably has a developer problem or your viewing conditions are inadequate (be sure that you are using the appropriate light source).

To prevent leuco cyan dye problems, follow the recommended start-up procedure and replenish your bleach-fix correctly to ensure that the pH of the bleach-fix will remain in the recommended range.

Note: If you use EKTACOLOR RA Bleach-Fix and Replenisher NR to prepare a fresh tank solution, add only one-half the normal amount of Part C to the mix. If you use EKTACOLOR RA Bleach-Fix and Replenisher to prepare a fresh tank solution, add 22 mL/L of tank volume of KODAK EKTACOLOR Developer Starter, CAT 102 6681, to the mix.

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